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*Introduction to the Rarer Elements.* By PHILIP E. BROWNING, Ph.D., Assistant Professor of Chemistry, Yale University. Second edition, thoroughly revised. New York, John Wiley & Sons. 1908. Pp. x+207, 2 plates.

The first edition of this book was reviewed in these columns in 1903.<sup>1</sup> After five years it has been revised, much new material being added. This is especially the case in regard to the radio-elements, the excellent chapter upon that topic being contributed by Professor Boltwood, a colleague of the author.

While the book is teeming with information, it does not pretend to be a compendium. However, one feels the lack of proportion when he observes that forty-nine double chlorides of cesium (p. 11) are mentioned and only one oxide of rubidium is named. The statement is made (p. 63) that metallic praseodymium and neodidymium have not been separated. Muthmann accomplished this very cleverly several years ago and his method has been applied successfully in the reviewer's laboratory. Good crystals of metallic thorium have also been obtained by another method, namely, reduction by aluminium, published in the Year Book of the Carnegie Institution. It is not mentioned. A satisfactory method for separating zirconium and aluminium (p. 78) published fifteen years ago is not incorporated. Nor is the only good method for separating zirconium and titanium (by hydrogen dioxide) given. The chapter on the uses of the rarer elements is in much need of revision. The recent work on scandium is not included.

The colored plate of the spectra is a good illustration of the printer's art, but the small plate on the absorption spectra is poorly chosen, in fact, is incorrect. Additional plates would be helpful, as well as a general discussion of some of the principles involved in the fractionation of these "complexes of elemental matter," as Crookes put it. There is an index, but it is inadequate.

The book must have served a good purpose and every library of chemical works should have a copy, for the term "rare earth" does

<sup>1</sup>SCIENCE, N. S., XVIII., 497.

not frighten teacher or student quite as badly as formerly. This is due in large part to a book of such rightness of purpose as is this one.

CHAS. BASKERVILLE  
COLLEGE CITY OF NEW YORK

#### SCIENTIFIC JOURNALS AND ARTICLES

*The American Museum Journal* for March contains the following articles: "The Darwin Celebration," with views of the bust of Darwin presented to the museum by the New York Academy of Sciences; "New Habitat Groups of North American Birds," six in all, with an illustration of each. These groups mark the highest point reached in presenting to the public an accurate idea of the bird life of various parts of our country; they have been made possible by the liberality of a number of friends of the museum and of the public. A notice of "The Annual Meeting of the Trustees" notes that the present endowment fund is \$2,048,156, and that last year the museum expended \$115,488, and the city \$159,930. There is a letter from Mr. Stefansson, on "The Stefansson-Anderson Arctic Expedition," and an account of "Recent Purchases of Fossil Vertebrates."

*The Museums Journal* of Great Britain for February has an article on the "Victoria and Albert Museum," reviewing the recent report on its rearrangement, classification of its material, relations of the national museums to one another, and on the general policy of the institution. Most interesting is the account given by Rev. J. S. Whitewright of "Pioneer Museum Work in China." The models, diagrams and maps, many of them large and elaborate, were made on the spot by Chinese artisans. The number of visitors—there were 69,745 in thirty-six days—shows the success of the work. Robert Standen tells how to make and use "Glue and Turpentine Cement for Alcoholic Mounts." There are the customary reviews and notes.

#### SPECIAL ARTICLES

##### A LITTER OF HYBRID DOGS

SEVERAL years ago the writer had the opportunity of observing the results of a cross be-

tween two "thoroughbred" dogs. The breeds were sharply contrasted in many characters and the results were so striking that an effort has been made to collect the data regarding the offspring, from the owner of the dogs. While the data thus obtained are of course very incomplete, they are considered of sufficient interest to merit a brief record. Prac-

tically nothing of a scientific character appears to have been done in this very interesting field for students of heredity.

The mother of the cross in question was an Old English Bobtailed Sheep Dog and the father a Scotch Collie so-called. Both were typical specimens of their respective breeds. The dogs were accompanied by a guarantee

	Mother	Father	Pup No. 1	Pup No. 2	Pup No. 3	Pup No. 4	Pup No. 5	Pup No. 6
Color.	Grizzly throughout except white breast.	Black and tan, breast white, body jet-black, legs tan from feet to first joint.	Black, breast and paws white.	Blue-gray throughout, except white breast and paws.	Body black, legs light tan.	Body black, legs light tan.	Dark brown, except white breast.	Large patches of white and light yellow over whole body. Fore legs white, hind yellow.
Character of coat.	Long and shaggy over whole body, including eyes, face and legs.	Heavy and wavy.	Shaggy, hanging over eyes, face and legs (mother) but very wavy (father).	Shaggy, long, wavy hair over whole body, including eyes, face and legs.	Hair short and smooth.	Hair short and smooth.	Thick, wavy hair over whole body, including face and legs.	Hair short and smooth.
Tail.	None. No projecting bone.	Long and bushy, jet-black.	About four inches long.	About four inches long.	About eight inches long.	About eight inches long.	Six inches long with a kink in the middle.	Long and bushy, yellow.
Eyes.	Dark brown.	Light brown.	Dark brown.	Dark brown.	Light brown.	Light brown.	Dark brown.	One wall eye, one light brown.
Disposition.	Very gentle and timid.	Playful and aggressive.	Gentle and timid (mother) but at times inclined to snap (father).	Very gentle.	Very aggressive.	Gentle.	Aggressive.	Very timid.
Legs and body.	Body long, legs long. Hind legs very short from feet to hock, but very long from hock to hip.	Legs ordinary length and shape.	Like mother.	Like mother.	Like father.	Like father.	Like mother.	Like father, but smaller.
Shape of head.	.....	.....	Like mother.	Like mother.	Like father.	Like father.	Like mother.	Like father, but smaller.
Sex.	.....	.....	Male.	Male. Like No. 1, except in color.	Male.	Female. Just like No. 3 except disposition.	Male.	Female.

that they were thoroughbred, and were brought from England to Nova Scotia by an English gentleman for the purpose of crossing them to produce a dog for farm purposes.

I had occasion to observe both dogs carefully for a considerable period, and I also owned one of the pups for several years. The pups were born in June, 1894. I am, of course, aware of the dangers of collecting *post facto* data and have therefore included here only such facts as I can verify with certainty from my own recollection. The data given under "legs and body" and "shape of head" are of course only general impressions of a probably more or less blended condition.

The accompanying table shows some of the contrasting characters in the parents and the offspring. The most striking contrasts are afforded by the color and character of the coats, the presence and absence of the tail, and its variability in the offspring, and by the dispositions, that of the mother being very gentle and timid, while the father had the aggressive collie disposition. The litter contained more than six pups, but these are the only ones which can now be sharply and definitely characterized. It is a noteworthy fact that several of them are in pairs which are very closely alike, differing markedly in only one character so far as observed. Numbers 1 and 2 were alike except in color, one having the general color of the mother, and the other that of the father but without any tan. Numbers 3 and 4 constituted another very clearly marked pair, differing widely from the others in many characters and yet so closely alike that they were scarcely distinguishable, except in their dispositions, which were quite unlike. This recalls some cases of identical human twins. These animals were not of the same sex, however.

In comparing the characters of the offspring with those of the parents it will be seen that in no character was there complete dominance of one parent in all the offspring. In coat color the father dominated in all but two, in one of which (No. 2) the color was that of the mother. The long, shaggy coat, covering the face and legs as well as the body, appeared in Nos. 1 and 2 of the offspring, except that the

effect of the wavy hair of the father was also more or less evident. In No. 5 the coat more nearly resembled the father, but in Nos. 3, 4 and 6 was quite unlike either parent, being short, smooth and sleek. The differences in eye color may not be significant, as the collies' eyes range from light to dark brown, and in the sheep dogs a wall eye is not uncommon and is considered typical of the breed.

The inheritance of the tail character is of considerable interest, showing as it does a range from the long bushy tail of the father to a condition approaching its complete absence as in the mother. The intermediate tail lengths can not be attributed wholly to inheritance from the father, however, for dogs with more or less of a tail are said to occur frequently in the pure sheep-dog breed. How the tailless condition originated appears to be unknown, although various statements and conjectures are made in dog books concerning this matter. Two breeds of bob-tailed collie, with tails 5-10 cm. long but otherwise in every particular like the collie, are recognized in certain parts of England<sup>1</sup> (II., p. 440). Walsh<sup>2</sup> says (p. 221):

Until within the last half-century sheep dogs without tails were exempt from taxation, it being supposed that no one would keep a tailless dog who could afford to pay the tax. As a consequence almost every sheep dog had its tail cut off, and owing to this cause the tailless sheep dog, still met with in some localities, is supposed to have arisen. . . . It is far more probable that the bob [in pointers] is derived from a cross with the bull dog, which is subject to the natural loss of tail in a greater or less degree, and was probably used to give courage to the pointer. . . . Usually these "bobs" [the old English sheep dog] are strongly made and symmetrical dogs, but without any definite type; they have frequently a tendency to the brindle colour, which favours the theory of the derivation of short tails from the bull dog though it cuts equally against a similar derivation in the pointers, in whom the brindle is absolutely

<sup>1</sup> "Dogs of All Nations," 2 vols., London, 1905, illustrated.

<sup>2</sup> Walsh, J. H., "The Dogs of the British Islands, etc.," 5th edition, London, 1886, pp. 292, illustrated.

unknown. Not being able to arrive at any definite type of the "bob-tail," I shall not attempt to describe him.

From this writer it would appear that the Old English Bob-tail is a recent, or at least variable and poorly characterized breed. Lee<sup>8</sup> states, however, that Reingle's picture in the "Sportsman's Cabinet," very early in the last century, is typical of the breed as at present known, showing that this breed has probably existed for at least a century. He further states that it is possibly older than the collie. The varieties in England and Scotland are said to be identical, except that the latter usually has a long tail, the reason attributed for this being that the owners have steadfastly refused to amputate it! It is stated that in England many of these dogs are born either without tails or with very short ones, pups with and without tails usually occurring in the same litter. The tails may be docked so that no one can tell that the animals were not born tailless. They are said to be jet-black at first with white markings, in a few weeks becoming "silvery-lilac."

This writer argues that the antiquity and concentration of the strain is shown by the fact that if there is a strain of this breed in such breeds as the retriever, lurcher or spaniel many generations back, a typical specimen will occasionally appear.

In the "Dogs of All Nations" already referred to, which is a standard authority on the good and the bad points in the various breeds of dogs, giving their characterization according to the various dog clubs and breeders, a black and tan or brindle coat is considered a fault in the Old English Bobtail breed (*l. c.*, II., p. 471).

Such remarkable diversity as here described in a single litter of offspring could not be accounted for by the effect of external conditions of development and must therefore be due to differences of some sort in the germ cells of either or both parental individuals. No one

<sup>8</sup> Lee, Rawdon B., "A History and Description of the Modern Dogs of Great Britain and Ireland (Non-sporting Division), etc.," London, 1899, pp. 428.

character is present in all the offspring to the exclusion of its homologue. There is a decided tendency in any given character for the offspring to "take after" one parent or the other, though in certain cases, as in the character of the hair in Nos. 3 and 4, there is a marked departure from either parent. This is perhaps the reappearance of a character derived from some cross in the ancestry of one of the breeds.

One further fact worthy of mention is the disposition of dog No. 1. I had him in my possession for several years and often observed the usually very subdued and timid behavior, and at times the sudden and unexpected change to the aggressive attitude of his father. It will be noted that some of the dogs inherited the aggressive disposition of their father and others the timid and gentle disposition of their mother.

R. R. GATES

UNIVERSITY OF CHICAGO,  
April 2, 1909

THE AMERICAN ASSOCIATION FOR THE  
ADVANCEMENT OF SCIENCE  
SECTION E—GEOLOGY AND GEOGRAPHY

SECTION E, Geology and Geography, of the American Association for the Advancement of Science, met Monday morning, December 28, 1908, at Johns Hopkins University. The section organized at 11 A.M., immediately after the adjournment of the general meeting of the association. The first five papers of a Symposium on Correlation were given during the morning and afternoon sessions on Monday. This symposium was continued on Tuesday and Wednesday under the auspices of the Geological Society of America.

Professor J. P. Iddings, of Chicago, gave his vice-presidential address, "The Study of Igneous Rock," on Monday, at 2:30 P.M.<sup>1</sup>

According to the custom for several years past, Section E adjourned Monday P.M., but its fellows and members were cordially invited to be present at the sessions of the Geological Society of America, December 29 to 31, 1908, and at those of the Association of American Geographers, January 1 and 2, 1909.

Following the dinner of the Geological Society of America on Wednesday evening there was a discussion of the relations that should obtain

<sup>1</sup> SCIENCE, Vol. XXIX., pp. 202-217.